Key to Icons

Web site.*
Interagency agreement.

433.01 Introduction

This chapter includes information and requirements for describing groundwater resources in the vicinity of the project area, and detailing potential significant adverse environmental impacts of project alternatives on these resources. Other information relevant to this chapter may be found in **Chapter 420** (Geology and Soils) and **Chapter 431** (Water Quality/Surface Water).

(1) Summary of Requirements

In general, transportation projects must be designed to avoid significant adverse environmental impacts to groundwater resources, and mitigate any unavoidable adverse impacts (e.g. through use of Best Management Practices (BMPs)).

A full Discipline Report is required when one or more project alternatives may introduce enough stormwater or wastewater into an aquifer or its recharge zone to create a significant adverse environmental impact. The Groundwater Discipline Report should include information on regional and local aquifers underlying and/or proximally down gradient from the project area, and determine whether stormwater or wastewater discharges produced by any project alternatives are likely to enter Sole Source Aquifers (SSAs), Critical Aquifer Recharge Areas (CARAs), or Wellhead Protection Areas (WPAs) in quantities sufficient to produce a significant adverse environmental impact. It should also identify other significant adverse environmental impacts to groundwater, and mitigation options for identified impacts.

WSDOT's Groundwater Discipline Report Checklist (**Exhibit 433-1**) provides a concise framework for describing groundwater conditions and detailing significant adverse environmental impacts of project alternatives. Information referred to in this chapter, including legislation, regulations and regulatory

* Web sites and navigation referenced in this chapter are subject to change. For the most current links, please refer to the online version of the EPM, available through the ESO home page: http://www.wsdot.wa.gov/environment/

(permitting) processes, Interagency Agreements, and technical resources, provides the basis for the checklist.

(2) Abbreviations and Acronyms

Abbreviations and acronyms used in this chapter are listed below. Others are found in the general list in **Appendix A**.

AKART	All known, available, and reasonable methods of prevention, control, and treatment
BMPs	Best Management Practices
CARA	Critical Aquifer Recharge Area
DOH	Washington State Department of Health
GIS	Geographical Information System
GMA	Growth Management Act
NPDES	National Pollutant Discharge Elimination System
OSS	On-site Sewer
SDWA	Safe Drinking Water Act
SSA	Sole Source Aquifer
SSP	Stormwater Site Plan
SWAP	Source Water Assessment and Protection
SWDP	State Waste Discharge Permit
UIC	Underground Injection Control
WPA	Wellhead Protection Area

(3) Glossary

Terms described in this chapter are listed below and also included in the general glossary in **Appendix B**.

Critical Aquifer Recharge Area (CARA) – Area designed by a city or county for protection under the Growth Management Act.

Injection Well – Any disposal system designed to place fluids, including highway runoff and treated wastewater from onsite sewage disposal systems, into the subsurface. Such systems include bored, drilled, or dug holes; for example dry wells, French drains, and drainfields.

Sole Source Aquifer (SSA) – Any aquifer which (1) is so designated by USEPA, (2) supplies 50 percent or more of the drinking water to the population living over the aquifer, (3) has distinct hydrogeological boundaries, and (4) for which there is no economically feasible alternative source of drinking water if it should be contaminated.

Source Water Protection Area – Area protected for drinking water supplies.

Water Right – Legal authorization to use a certain amount of public water for specific beneficial purposes.

Wellhead Protection Area – Area managed by a community to protect groundwater drinking water supplies.

433.02 Applicable Statutes and Regulations

This section lists the primary statutes and regulations applicable to groundwater issues. See **Appendix D** for a list of statutes referenced in the EPM. Permits and approvals required pursuant to these statutes are listed in **Section 433.06**.

(1) Federal

(a) National Environmental Policy Act/State Environmental Policy Act

The National Environmental Policy Act (NEPA), requires that all actions sponsored, funded, permitted, or approved by federal agencies undergo planning to ensure that environmental considerations such as impacts on groundwater are given due weight in project decision-making. The State Environmental Policy Act (SEPA) mandates a similar procedure for state and local actions. Federal implementing regulations are at 23 CFR 771 (FHWA) and 40 CFR 1500-1508 (CEQ) State implementing regulations are in WAC 197-11 and WAC 468-12 (WSDOT). For details see **Chapter 410** and **Chapter 411**.

(b) Safe Water Drinking Act

The Safe Drinking Water Act of 1974 (SDWA), 42 USC, Chapter 6A, sets national primary drinking water standards, regulates underground injection of fluids, and designates sole source aquifers. Amendments were added by Congress in 1986 and 1996. The 1996 amendments identify source water protection, water system operator training, and public information as components of safe drinking water programs. This law is online at:

http://www4.law.cornell.edu/uscode/

Click on Title 42, Chapter 6A, Subchapter XII, Safety of Public Water Systems.

Or by direct link:

http://www4.law.cornell.edu/uscode/42/ch6A.html

Or by direct link:

http://www.epa.gov/safewater/sdwa/sdwa.html

Amendments of 1996, Public Law 104-182 are located at:

http://www.epa.gov/OGWDW/

Click on Safe Drinking Water Act, then select the link to the 1996 amendment text.

Or by direct link:

http://www.epa.gov/safewater/sdwa/text.html

(c) Clean Water Act

The federal Clean Water Act (Water Pollution Control Act), described in **Section 431.02,** applies to groundwater.

(2) State

Washington State laws (RCW) and rules (WAC) relevant to groundwater are located at Ecology's web site:

http://www.ecy.wa.gov/

Click on Laws and Rules, then Index of Laws (RCW) or Index of Rules (WAC), and look under the Water Quality, and Water Resources sections.

Or by direct link for RCW:

http://www.ecy.wa.gov/laws-rules/ecyrcw.html

Or by direct link for WAC:

http://www.ecy.wa.gov/laws-rules/ecywac.html

(a) Clean Water Act Implementation

State water quality regulations are mandated by the Clean Water Act referenced above. In Washington State, RCW 90.48 is the primary water pollution law. Under this statute, discharge of pollutants into waters of the state, including groundwater, are prohibited unless authorized. Because many citizens drink groundwater and use it in their homes, the state of Washington currently classifies all of its groundwater as a potential source of drinking water. The act is administered by Ecology, and is found on Ecology's web site:

http://www.ecy.wa.gov/

Click on Laws and Rules, then Index of Laws (RCW) then Title 90, then 90.48, Water Pollution Control.

Or by direct link:

http://www.leg.wa.gov/RCW/index.cfm?fuseaction=chapterdigest&chapter=90.48

(b) Water Quality Standards for Groundwater

WAC 173-200 mandates groundwater quality standards to maintain the highest quality of the state's groundwaters and to protect existing and future beneficial uses of the groundwater through the reduction or elimination of contaminant discharge. All wastes must be provided with all known, available, and reasonable methods of prevention, control, and treatment (AKART) prior to discharge into the state's waters.

The requirements, administered by Ecology through the State Waste Discharge Permit (SWDP) and the National Pollutant Discharge Elimination System (NPDES) permit programs, are available online at:

http://slc.leg.wa.gov/

Click on WAC, then Title 173, then 173-200.

Or by direct link:

http://www.leg.wa.gov/WAC/index.cfm?fuseaction=chapterdigest&chapter=173-200

Implementation Guidance for the Groundwater Water Quality Standards (Ecology Publication #96-02) is online at:

http://www.ecy.wa.gov/

Click on Programs, then Water Quality, then Groundwater, then Implementation Guidance.

Or by direct link:

http://www.ecy.wa.gov/biblio/96002.html

(c) Wellhead Protection

Wellhead protection is mandated by the federal Safe Drinking Water Act. In Washington, the Department of Health (DOH) is designated as lead agency for the wellhead protection program. A wellhead protection area is the area managed by a community to protect its groundwater drinking water supplies. In 1994, WAC 246-290 was modified to include wellhead protection for all public water systems using groundwater. DOH uses the term "Group A" to designate public water systems that serve 25 or more people, or 15 or more connections. Regulations are online at:

http://slc.leg.wa.gov/

Click on WAC, then Title 246, then Chapter 246-290, Public Water Supplies.

Or by direct link:

http://www.leg.wa.gov/WAC/index.cfm?fuseaction=chapterdigest&chapter=246-290

(d) Underground Injection Control

The Underground Injection Control (UIC) Program, authorized by the Safe Drinking Water Act (SDWA), is designed to prevent contamination of underground sources of drinking water from the use of injection wells. A UIC well is a hole that is constructed to put water and other fluids into the ground. In Washington, most of these wells are dug to dispose of stormwater or wastewater (e.g.: drywells, drainfields, and infiltration trenches).

The UIC Program was established in 1984 and is administered under 40 CFR, Part 144. Ecology was delegated authority by USEPA to administer the program in Washington State, under authority of RCW 43-21A.445 and WAC 173-218. All new underground control activities must treat the "waste" fluid before injection. For the current minimum acceptable level of treatment, see WSDOT's approved *Highway Runoff Manual* (M 31-16) for stormwater standards, and the current Department of Health standards for onsite sewage.

For information on the UIC law see:

http://slc.leg.wa.gov/

Click on WAC, then Title 173, then Chapter 173-218, Underground Injection.

Or by direct link:

http://www.leg.wa.gov/WAC/index.cfm?fuseaction=chapterdigest&chapter=173-218

For information on the UIC Program see:

http://www.ecy.wa.gov/

Click on Programs, then Water Quality, then Groundwater, then Underground Injection Control Program.

Or by direct link:

http://www.ecy.wa.gov/programs/wq/grndwtr/uic/index.html

(e) Growth Management Act

In 1990, the Washington State Legislature adopted the Growth Management Act (GMA), RCW 36.70A. This statute, combined with Article 11 of the Washington State Constitution, mandates that local jurisdictions adopt ordinances that classify, designate, and regulate land use in order to protect critical areas. Critical areas include aquifer recharge areas, which are regulated through local Critical Aquifer Recharge Area (CARA) ordinances. See **Section 451.02** for more information on the GMA.

Under the GMA, state agencies must comply with local comprehensive plans and development regulations (RCW 36.70A.103); likewise local agencies should coordinate with WSDOT.

(3) Local Critical Aquifer Recharge Area Ordinance

The purpose of Critical Aquifer Recharge Area (CARA) ordinances is to provide cities and counties with a mechanism to classify, designate, and regulate areas deemed necessary to provide adequate recharge and protection to aquifers used as sources of potable (drinking) water. Unless the local laws conflict with state law, WSDOT must meet the requirements of local regulations. Local planning departments should be contacted to determine the location or descriptive criteria of geologically hazardous areas that may impact the project.

Information on the ordinances which define and regulate Critical Aquifer Recharge Areas, is located at:

http://www.ecy.wa.gov/

Click on Programs, then Water Quality, then Groundwater, then Critical Aquifer Recharge Area Ordinances.

Or by direct link:

http://www.ecy.wa.gov/programs/wq/grndwtr/cara/index.html

Ecology's Guidance Document for the Establishment of Critical Aquifer Recharge Area (Ecology Publication # 97-030) is online at:

http://www.ecy.wa.gov/

Click on Publications, then search for 97-030.

Or by direct link:

http://www.ecy.wa.gov/biblio/97030.html

433.03 Policy Guidance

(1) Washington State Transportation Commission

The Transportation Commission's Policy Catalog contains a specific policy on water quality. Policy 6.3.2 is: "Minimize the impact that construction, operation and maintenance of transportation facilities has on the state's surface and groundwater. Minimize and control levels of harmful pollutants generated by transportation activities from entering surface and groundwater resources."

(2) State Source Water Assessment and Protection Programs Guidance

State Source Water Assessment and Protection (SWAP) Program guidance is required under the SDWA Amendments of 1996 (Public Law 104-182, Section 1453) to ensure better quality drinking water. Water assessments will generate information on significant potential contamination sources and will also generate information regarding the susceptibility of systems to contamination. The USEPA is responsible for the review and approval of state SWAPs.

State Source Water Assessment and Protection Programs Final Guidance (April 1997) describes USEPA's recommendations for what should be the elements of a State SWAP program, and of the importance of federal, state and public cooperation in developing and implementing SWAP programs (USEPA publication 816-R-97-009). The document is online at:

http://www.epa.gov/OGWDW/

Click on Publications, then Protection of Drinking Water Sources and select Source Water Assessment and Protection, then State Source Water Assessment and Protection Programs Final Guidance, April 1997.

Or by direct link:

http://www.epa.gov/safewater/swp/swappg.html

433.04 Interagency Agreements

(1) Sole Source Aquifers

The Memorandum of Understanding between FHWA Region 10, USEPA Region 10 and WSDOT on sole source aquifers aims to ensure that each highway project is designed and constructed in a manner that will prevent the introduction of contaminants into a sole source aquifer (SSA) (an aquifer that supplies 50 percent or more of the drinking water of an area) in quantities that may create a significant hazard to public health. The MOU is online via the Environmental Services Office web site:

http://wsdot.wa.gov/environment/compliance/agreements.htm

MOU Between the FHWA Region 10, Portland, Oregon and the USEPA Region 10, Seattle, Washington and WSDOT, Olympia, Washington: Sole Source Aquifer, State of Washington, June 1988.

For a WSDOT project to be within the scope of the MOU, all three of the following conditions must be met:

- USEPA-designated SSA
- Federal funding
- Project type included, not excluded

The MOU includes lists of sole source aquifers as of 1988 (Attachment A), excluded projects (Attachment B), projects that should be submitted to USEPA (Attachment C), and 1987 National Primary Drinking Water Regulations (Attachment D).

Federal funds may not be expended unless the project is designed to avoid any violation of federal or state drinking water regulations referenced in the MOU, and partially listed in Attachment D.

To comply with the Sole Source Aquifer MOU:

- Provide USEPA early opportunity to participate in development and review of environmental documents. USEPA should be contacted before the first draft document is circulated outside WSDOT for general review.
- Immediately transmit to USEPA any agency comments received indicating adverse impacts on the aquifer.
- Respond to USEPA direction.

USEPA has designated nine Sole Source Aquifers in Washington. They are: Cedar Valley Aquifer, Cross Valley Aquifer, Guemes Island Aquifer, Marrowstone Aquifer, Newberg Aquifer, Pierce County Aquifer System, Spokane Valley Rathdrum Prairie Aquifer, Vashon Aquifer, and Whidbey and Camano Island Aquifers.

The use of injection wells (such as dry wells, sumps, and drainfields) for stormwater treatment and disposal is common over these aquifers. All injection activities must meet Washington groundwater quality standards. Therefore, before injection, all stormwater must be treated using an approved stormwater BMP as contained in WSDOT's latest approved *Highway Runoff Manual* (M 31-16). USEPA may consider the use of other BMPs on a case-by-case basis or through an updated memorandum of Understanding between USEPA, FHWA, and WSDOT. In addition, if untreated stormwater runoff is disposed using injection wells, WSDOT must ensure that the injection well is retrofitted to apply the latest approved stormwater BMPs as identified in the *Highway Runoff Manual*.

For a map of sole source aquifers, see USEPA's web page:

http://www.epa.gov/

Click on Where You Live, then Regional Offices, then Region 10, then Index, then M, then Map Library, then Sole Source Aquifers (under Maps Related to Groundwater Activities).

Or by direct link:

http://www.epa.gov/r10earth/maps/ssarx.html

(2) Other Interagency Agreements

See **Appendix E** for a complete index to interagency agreements referenced in the EPM and a summary of provisions related to each phase of the WSDOT Transportation Decision-making Process.

433.05 Technical Guidance

(1) Groundwater Discipline Report

WSDOT's Groundwater Discipline Report provides discipline-specific information required for EAs, EISs, permits, and other environmental documents. This information includes a description of regional and local aquifers underlying the project area, whether these aquifers are designated as Sole Source Aquifers, and whether stormwater or wastewater discharges from each project alternative are likely to enter Critical Aquifer Recharge Areas or Wellhead Protection Areas. It should also identify other environmental impacts to groundwater, and mitigation options for identified environmental impacts.

A full Discipline Report is generally needed when any or all project alternatives would generate stormwater or wastewater that could enter the saturated zone of an unconfined aquifer or recharge zone for a confined aquifer.

A full Discipline Report is required when one or more project alternatives may introduce enough stormwater or wastewater into an aquifer or its recharge zone to create a significant environmental impact. A determination of frequency, quantity, and duration of introduced flows sufficient to produce a significant environmental impact will vary depending on the administrative classification of the groundwater resource area (e.g. SSA, CARA, WPA) and its location relative to the project. Early consultation with appropriate WSDOT and regulatory (WDOE, WDOH, county planning) staff is recommended. If a full discipline report is determined to be unnecessary, the rationale should be documented in a technical memo that is kept in the project file.

The Groundwater Discipline Report generally contains the following major sections:

- Summary
- Description of Project Alternatives
- Study Methodology
- Coordination
- Affected Environment
- Environmental Impacts
- Mitigation of Impacts
- References/Information Sources

Sections which are sufficiently brief may be combined with other sections where it makes sense to do so (e.g. Study Methodology and Coordination).

Technical reports, memoranda, data summaries, or other documentation developed to support the Discipline Report should be placed in one or more appendices after the main body of the report.

Further guidance for preparing the discipline report is provided below. A Discipline Report Checklist is provided as **Exhibit 433-1**.

(a) Summary

The summary presents significant findings of the report in non-technical terms. Significant findings include regional and local aquifers and their administrative designations (SSA, CARA, WPA), predicted environmental impacts, and mitigation recommendations. The summary should be suitable for incorporation into the environmental document (EA or EIS), for presentation at public hearings, or for use by management and policy groups in decision-making.

(b) Description of Project Alternatives

This section presents a brief description of project alternatives identified during the scoping process. Descriptions should be consistent with those in other discipline reports.

(c) Study Methodology

This section describes the approach used to determine and evaluate predicted environmental impacts and other report findings and conclusions. The description should include data and information sources, field methods, analysis techniques and tools, and decision criteria, and should be as succinct as possible. Detailed descriptions, where necessary, should be included in the appropriate appendix.

(d) Coordination

This section identifies agencies and other organizations involved with or contacted during the development of the report.

(e) Affected Environment

This section describes the existing conditions with respect to geology and soils in the vicinity of the project area. Topic areas include the following:

- *Hydrogeologic Setting* – describe regional and local aquifers in the vicinity of the project area.
- *Administrative Designations* – determine whether aquifers described above are designated as Sole Source Aquifers, Critical Aquifer Recharge Areas, or contain Wellhead Protection Areas that are likely to be impacted by the project.

(f) Environmental Impacts

This section describes the predicted environmental impacts of project alternatives on groundwater resources. Impacts to be considered include direct (construction and operational), indirect, and cumulative. For more information about analysis of impacts, see **Section 411.09(7)** and **Chapter 480**.

(g) Mitigation of Impacts

This section describes recommended or proposed mitigation measures, commitments, and monitoring procedures corresponding to impacts

described in (f) above, as well as mitigation measures considered or available but not included, with reasons why.

(2) WSDOT Highway Runoff Manual

The 2004 *Highway Runoff Manual* (M 31-16) provides a guide for policies, procedures, and methods for developing and documenting the design and maintenance of improvements to WSDOT's transportation system.

The manual contains approved methods of managing water quantity and quality from WSDOT facilities. These methods are known as Best Management Practices (BMPs). Selection criteria are established for the use of acceptable BMPs during construction and long-term maintenance of highways. Several of the BMPs identify groundwater-related limitations which may preclude their use; see Sections 3A-2.4, 5.4.2.3 (RT-06), 5.4.3.2 (FC-01), and 5A-3.1.2. Mitigation recommendations should consider if and where within the project area such limitations are likely. The *Highway Runoff Manual* is available online at:

http://www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/HighwayRunoff2004.pdf

(3) Wellhead Protection Program

A wellhead protection area is the area managed by a community to protect its groundwater-based drinking water supplies. WSDOT practice is to participate proactively in the development and implementation of local wellhead protection plans. If wellhead protection areas are identified that are likely to be impacted by one or more project alternatives, then the appropriate entities (well owner, local and state departments of health) should be consulted regarding appropriate protective and mitigation measures.

DOH provides technical guidance in the *Washington State Wellhead Protection Program Guidance Document* (DOH Publication #331-018, April 1995). The document includes information on the determination of wellhead protection areas, management strategies and implementation, program financing, and interagency issues.

(4) FHWA Technical Advisory

FHWA Technical Advisory T 6640.8A (October 1987) gives guidelines for preparing environmental documents, including specifically impacts on groundwater. For example, when a proposed project encroaches on a wellhead protection area (as identified by the state under approval by the USEPA), an EIS should identify the area, the potential impacts, and proposed mitigation measures for each alternative. For details, see FHWA's home page:

http://www.fhwa.dot.gov/

Click on Legislation and Regulations, then FHWA Directives and Policy Memorandums, then FHWA Technical Advisories, then T6640.8A.

Or by direct link:

http://www.fhwa.dot.gov/legsregs/directives/techadvs/t664008a.htm

(5) FHWA Environmental Guidebook

Guidance documents on Sole Source Designation Aquifer Programs, and Sole Source Aquifer Programs are available from the FHWA's Environmental Guidebook, online via FHWA's web site:

http://www.fhwa.dot.gov/

Click on FHWA Programs, then Environment, then Environmental Guidebook, then Safe Drinking Water Act.

Or by direct link:

http://www.fhwa.dot.gov/environment/guidebook/chapters/v1ch10.htm

433.06 Permits and Approvals

Permits relating to groundwater are addressed in the following sections:

State

- Section 540.12 – State Waste Discharge Permit
- Section 540.14 – Underground Injection Control Registration
- Section 540.21 – On-site Sewage Facility Permit
- Section 540.25 – Other State Approvals (Water Right, Water System Project Approvals)
- Section 540.25 – Other State Approvals (Dam Construction Permit, Reservoir Permit)

Local

- Section 550.10 – Other Local Approvals (On-site Septic systems, Water System Approval for non-public use such as a maintenance facility)

433.07 Non-Road Project Requirements

Ferry, rail, airport, or non-motorized transport systems are subject to the same policies, procedures, or permits that apply to road systems.

433.08 Exhibits

Exhibit 433-1 – Groundwater Discipline Report Checklist.

Washington State Department of Transportation

Discipline Report Checklist
Groundwater

Project Name: _____ Job Number: _____

Contact Name: _____

Date Received: _____ Date Reviewed: _____ Reviewer: _____

(SAT = Satisfactory; INC = Incomplete; MIS = Missing; N/A = Not Applicable)

Answers are required for questions which have no N/A box.

I. Summary

SAT	INC	MIS	N/A		
❒	❒	❒		A.	Describes significant environmental impacts, identified hazards, and mitigation recommendations in non-technical terms.
❒	❒	❒		B.	Summary is suitable for incorporation into the environmental document (EA or EIS), for presentation at public hearings, or for use by management and policy groups in decision-making.

II. Description of Project Alternatives

SAT	INC	MIS	N/A	
❒	❒	❒	❒	Briefly describes project alternatives identified during the scoping process; descriptions are consistent with those in other discipline reports.

II. Study Methodology

SAT	INC	MIS	N/A		
❒	❒	❒	❒	A.	Describes the approach used to determine and evaluate predicted environmental impacts and other report findings and conclusions, including data and information sources, field methods, analysis techniques and tools, and decision criteria.
❒	❒	❒	❒	B.	Detailed descriptions, where necessary, are included in the appropriate appendix.

IV. Coordination

SAT	INC	MIS	N/A	
❒	❒	❒	❒	Agencies and other organizations involved with or contacted during the development of the report are identified.

V. Affected Environment

SAT	INC	MIS	N/A		
❒	❒	❒	❒	A.	Describes regional and local aquifers in the vicinity of the project area.
❒	❒	❒	❒	B.	Sole Source Aquifers are correctly identified.
❒	❒	❒	❒	C.	Critical Aquifer Recharge Areas are correctly identified.
❒	❒	❒	❒	D.	Wellhead Protection Areas are correctly identified.

VI. Environmental Impacts

SAT	INC	MIS	N/A		
❒	❒	❒	❒	A.	Describes the predicted direct construction and operational impacts of project alternatives on groundwater resources.
❒	❒	❒	❒	B.	Describes the indirect and cumulative impacts of project alternatives on groundwater resources.

IV. Mitigation

SAT	INC	MIS	N/A		
❒	❒	❒	❒	A.	Describes recommended or proposed mitigation measures, commitments, and monitoring procedures corresponding to impacts described in Section VI above.
❒	❒	❒	❒	B.	Describes mitigation measures considered or available but not included, with reasons why.

General Comments: _____

_____

_____

_____